



A FORTNIGHTLY NEWSLETTER ON NUCLEAR DEFENCE, ENERGY AND PROLIFERATION FROM
CENTRE FOR AIR POWER STUDIES

Vol 09, No. 21, 01 Sep 2015

OPINION – Sam Nunn, Richard Lugar

There Are No Perfect Nuclear Deals

At the height of the Cold War, the Soviet Union had thousands of nuclear warheads aimed at American cities, and the Soviets were subject to numerous arms controls agreements. But progress was hard-fought and incremental at best. In an ideal world, the Soviet Union would have agreed to more severe constraints than those agreed by Presidents Kennedy, Nixon, Ford, Carter, Reagan and Bush, for example. It would have dismantled all of its nuclear weapons, stopped its human rights abuses and halted its meddling around the world.

But, as all of these presidents – Democratic and Republican – understood, holding out for the impossible is a recipe for no progress at all. Congress should take the same approach today to the Iran nuclear deal.

We know something about the long history of such agreements. During our combined 60 years in the US Senate, we participated in countless meetings, hearings and trips around the globe focused on reducing the threats posed by weapons of mass destruction. The centerpiece of our efforts was the Nunn-Lugar Act, passed in 1991, which was the basis for

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two decades of hard work that resulted in the safeguarding and deactivation of more than 7,000 nuclear warheads, hundreds of missiles and bombers, and numerous other elements of the former Soviet Union’s WMD programs.

These experiences underscored for us that arms control agreements are rarely finished absolutes. Inevitably, their success depends on many factors that play out after the agreement is signed, including alliance cohesion, congressional funding for implementation and the political will of the parties to

ensure verification and enforcement.

Over the next several weeks, every member of Congress will have the opportunity to weigh the terms of the nuclear agreement against all viable alternatives. In our view, the key questions regarding this agreement are: Will it stop Iran from obtaining a nuclear weapon? What are the risks of going forward with this agreement? And what are the risks if Congress rejects the agreement?

The plus-sides of this deal are clear. It includes severe restrictions on uranium enrichment and plutonium production, required transparency into Iranian activities and inspection provisions to assure the international community that Iran's nuclear program is, and remains, peaceful.

Reports that Iran will simply inspect itself to address unresolved allegations about its nuclear behavior have been refuted by the head of the IAEA, who has stated that the arrangements are technically sound, consistent with the IAEA's long-established practices and do not compromise IAEA safeguards standards in any way. Importantly, the agreement taken as a whole will help deter Iranian cheating and provide the means to detect violations in time to take strong action if required.

Could we conceive a stronger deal? Of course – that has been true of every arms control negotiation. We have heard critics suggest that Iran would have agreed to entirely dismantle its nuclear enrichment facilities and stop all activities related to its civil nuclear program if only the US had been tougher in negotiations. But had the US taken such an approach in the early 1990s, we would not have encouraged and helped Russia, Ukraine, Kazakhstan and Belarus safely accelerate the destruction of their weapons and materials of mass destruction, and the risk of accidents or catastrophic terrorism would have been far higher over the past 20 years.

Although there are no absolute guarantees, nor

can there be in diplomatic accords, our bottom line is that this agreement makes it far less likely that the Iranians will acquire a nuclear weapon over the next 15 years. As to risks in going forward with the agreement, Congress must listen carefully to both our intelligence community and the IAEA's views on any possible weaknesses in the verification regime, and then work with these entities to mitigate any vulnerabilities, both now and in the years ahead.

As with other agreements, Congress must recognize that there is no such thing as "perfect" verification. What is crucial, however, is whether "effective" verification can be achieved. Can cheating be detected in time to take action before

Iran could achieve a militarily significant advance? We believe the answer to that question is yes. The monitoring and verification provisions of this agreement are unprecedented in the history of arms control in their comprehensiveness and intrusiveness, and together with our intelligence capabilities should give us powerful tools to achieve effective verification.

Opponents of this agreement have offered criticism that sanctions relief would provide Iran with additional resources that would enable it to intensify its destabilizing behavior in the region. This is a risk, but the argument that this risk can be avoided or reduced by the defeat of this agreement rests on a patently false assumption. Anyone believing that the present effective economic sanctions will be continued by Russia, China, India and other nations if Congress rejects this agreement is in a dream world. This agreement and the alliance that brought Iran to the negotiating table through sanctions has focused on Iran's nuclear activities, not its regional behavior, though both are serious dangers. This alliance could never have been brought or held together to pursue a broad, nuclear and regional agenda on which alliance partners themselves strongly disagree.

What is crucial, however, is whether "effective" verification can be achieved. Can cheating be detected in time to take action before Iran could achieve a militarily significant advance? We believe the answer to that question is yes. The monitoring and verification provisions of this agreement are unprecedented in the history of arms control in their comprehensiveness and intrusiveness.

With or without this agreement, the US must continue and intensify our efforts with other partners to challenge and counter Iran's destabilizing regional activities and strengthen our cooperation with Israel and the Gulf States. If this agreement is rejected, both of these objectives become more difficult.

Finally, and perhaps most importantly, members of Congress must think long and hard about the consequences if this agreement is turned

down. There is no escaping the conclusion that there will inevitably be grave implications for US security and for US international leadership in the decades ahead. Sanctions allies will go their own way, reducing the effectiveness of our financial tools and leaving Iran in a stronger position across the board. Any future effort by this president or the next to assemble a "sanctions coalition" relating to Iran or other security challenges will be weakened. US leadership, diplomacy and credibility, including efforts to achieve support for possible military action against Iran, will all be severely damaged.

If, however, the Iran agreement is upheld by Congress, the hard work of monitoring and enforcement is just beginning. This Congress and future Congresses, as well as future presidents, have a large and continuing role to play in the decades ahead if "stopping the Iranian bomb" is to become a reality. Congress must insist that Iran be held to its commitments while not obstructing the agreement.

The US must make clear our commitment to the security of our allies and friends in the Middle East, through security assistance and a clear policy that Iranian meddling in the region will be firmly resisted. It must be clear which congressional committees are responsible for oversight and monitoring of implementation and compliance.

There should also be clear requirements for the president to report to Congress on intelligence associated with Iran. In addition, Congress must provide funding to the IAEA for its activities in monitoring Iranian compliance with this agreement as well as other nuclear proliferation activities in the Gulf region.

These crucial September votes will require members to search their own consciences. Whether they vote "yea" or "nay," they must first look in the mirror and ask

whether they are putting our nation's interest first. Our own conviction is that this agreement represents our best chance to stop an Iranian bomb without another war in the Middle East.

Source: <http://www.politico.com/magazine/story/2015/08/there-are-no-perfect-nuclear-deals-121810>, 30 August 2015.

OPINION – Edward-Isaac Doveve, Burgess Everett

White House Pushes for Iran Filibuster

The administration seeks to tamp down expectations, but the numbers of supportive Senate Democrats are adding up. President Obama's almost certain to get the Iran nuclear deal – but whether he gets there by filibuster or sustained veto could make all the difference. A Democratic filibuster in the Senate would be a clear victory for the president, allowing Obama to say that for all the political noise there wasn't enough actual opposition to the nuclear agreement with the Islamic republic to even get to a final vote.

Having to save the deal with a veto (just the fifth of his presidency) and relying on liberals in the House and Senate to sustain it would be much more trouble: a procedural pull across the finish line that sows more doubts in a public already skeptical of the deal, leaves international partners

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worried about America's long-term commitment and adds weeks of added time and tangles.

The White House very much prefers option A. And even before he came out publicly for the deal Senate Minority Leader Harry Reid (D-Nev.) had been in frequent contact with White House chief of staff Denis McDonough to try to make that happen. The numbers are tight: They'll need 12 of the remaining 15 undecided Senate Democrats to go Obama's way, along with the 29 already there. Obama, White House aides and Senate minority whip Dick Durbin (D-Ill.) – who's been running the unofficial Iran vote-counting operation – have been scrambling to lock down the remaining votes to get 41 Democrats to stick with the president.

...Obama faces a huge pile-up of trouble if he has to veto the bill, and they know it in the West Wing. Already facing major public skepticism about the deal, this could brew more doubt. The other governments involved have expressed their own wariness, concerned that a deal preserved only by a sustained veto might represent a lack of long-term American commitment.

"There's a cost to the international credibility of the country and this president if a motion of disapproval passes the House and the Senate," said Sen. Chris Murphy (D-Conn.), who's working with Durbin. "There is some harm to the country's standing if we have to go through the charade of the veto." Both the West Wing and Durbin's team are trying to avoid setting premature confidence.

The White House is trying not to set expectations high by openly seeking a filibuster. Right now, the president looks strong as it becomes nearly mathematically impossible for GOP leaders to build a veto-proof majority in either the House or Senate. "The president's only concern here is that Congress doesn't take this off the rails," said White House spokesman Eric Schultz.

Opponents of the deal say forcing the president to veto the measure would send a message to Iran that enough members of Congress are ready to impose new sanctions on Tehran if it fails to follow the accord. Forcing the president to pull out his veto pen is "important as a statement to Iran, and may make it more likely that Iran keep the promises about what it will not do," said former Connecticut Sen. Joe Lieberman, chairman of United Against Nuclear Iran and with his hand in two other opposition groups, though he refused to concede that Obama would be safe from an override vote.

Lieberman, once a Senate Democrat himself, has been helping direct millions of dollars in opposition ads to swing Democrats' home states and lobbying former colleagues hoping to seize some momentum against the deal. But his former leader's iron grip on the Democratic caucus threatens to upstage work by the hawkish wing of the Democratic Party and opposition to the deal from Democratic Sens. Chuck Schumer of New York and Robert Menendez of New Jersey. When Reid talks to Senate Democrats, he's being very explicit.

Of the Democrats left undecided, the White House is most concerned with "no" votes from Sen. Ben Cardin of Maryland and Sen. Cory Booker of New Jersey. Losing either one would be an embarrassment for the White House: Cardin is not only the ranking member of the Foreign Relations Committee, he's also a Jewish Democrat and a senator who helped Obama work out the legislation that the Senate could now use to spike him. Booker has for years put himself forward as a friend and strong ally of Obama, but he's under pressure from his constituents to align with Menendez and Schumer, so far the only two against. Pro-deal Senate Democrats, meanwhile, have focused on Sens. Richard Blumenthal (D-Conn.) and Gary Peters (D-Mich.), who are both seen as more promising potential yeses.

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But timing is also a factor. Opponents like Lieberman say the Iran debate isn't "static," changing daily as Iranian leaders utter bellicose rhetoric and new revelations about secret deals with international inspectors roll out. The longer the debate goes on and the more negative polls that come out, the better for opponents, they reason. With the UNGA meeting set for after the initial vote, the White House would much rather have Israeli PM Netanyahu come to New York to rail against an Iran deal that's already on the books, versus Netanyahu rolling up to a UN podium to call on lawmakers to overturn an Obama veto as one last chance to stop the deal.

"If there is a filibuster, this process will be over by then and this visit can be used as an opportunity to start to repair the damage with Israel," said Ilan Goldenberg, a former State Department official and director of the Middle East Security Program at the Center for a New American Security. "But if we are still in the middle of a veto fight it will further exacerbate tensions with the Israelis."

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A veto fight would also run up against other issues that the White House wants to spend September on. The White House has learned from bitter experience that Obama rarely comes off well the more he gets entangled with Congress, and raw feelings from a veto fight won't help as they try to avoid another shutdown over the budget and Planned Parenthood funding.

"Everyone was conditioned that he was going to veto this, so the fact that we're having a conversation about a filibuster shows how far we've come," said a White House aide familiar with the internal deliberations. Expected legions of constituents didn't materialize at town halls over the August recess. Anti-Iran-deal spending fell flat, moving almost no one. Moderate Democrats like Claire McCaskill of Missouri and Joe Donnelly of Indiana backed the deal, and Durbin didn't get any bad surprises.

The administration has been pushing hard on

wavering Democrats to run up the vote in September, from calls that the president is making directly to senators to State Department officials promising a group of senior Hill communications staffers in a meeting before the August recess that they'll make Energy Secretary Ernest Moniz and Secretary of State John Kerry available to local news outlets to provide air cover, according to two sources on Capitol Hill.

Source: <http://www.politico.com/>, 27 August 2014.

OPINION – Kelsey Davenport

Restrictions on Iran's Nuclear Program: Beyond 15 Years

Experts and analysts broadly agree that the nuclear deal struck between the P5+1 and Iran on 14 July 2015 will effectively and verifiably block Iran's potential pathways to nuclear weapons for 15 years or more. Absent the agreement, Iran's capacity to enrich uranium could rapidly increase and sharply reduce the time it would take Iran to produce enough fissile material for a nuclear

weapon.

Although several key restrictions on Iran's uranium-enrichment capacity and its stockpile of enriched uranium will expire after 15 years, the deal – known as the Joint Comprehensive Plan of Action (JCPOA) – establishes several other restrictions and tools that will help constrain and provide deep insights into Iran's nuclear program far beyond the first 15-year period.

These restrictions include a more intrusive and permanent inspections regime that will provide the IAEA far greater access to and information about Iran's nuclear program than under the current safeguards regime. Among these are continuous monitoring of Iran's uranium mining activities and its centrifuge manufacturing sites. In addition, the JCPOA permanently prohibits Iran from conducting certain "activities which could contribute to the design and development of a

nuclear explosive device.”

Taken together, these additional restrictions and transparency measures will provide the international community with a powerful set of tools to promptly detect and deter an Iranian attempt to pursue nuclear weapons well beyond the initial 15-year period.

Increased Monitoring and Transparency: After 15 years a number of intrusive monitoring and verification mechanisms remain in place that will give the international community a clearer picture of Iran’s nuclear program and an early warning if Iran intends to increase its enrichment capacity.

The IAEA will be able to continuously monitor Iran’s production of centrifuges for 20 years and it will be able to continuously monitor uranium mines and mills for 25 years. Taken together, the continuous surveillance on these elements will help ensure that the IAEA and the international community will be aware of Iran’s capabilities and resources, allowing for assessment of how quickly Iran could ramp up its program and produce enough material for a nuclear weapon.

Even after these restrictions sunset, the deal puts in place a more intrusive inspections regime as compared to what Iran is currently subject to by the IAEA. Implementation, and eventual ratification, of Iran’s additional protocol will allow for short-notice inspections at all of Iran’s nuclear facilities. Inspectors can access Iran’s declared nuclear facilities in as little as two hours if they are already on site. This is particularly important for monitoring Iran’s uranium-enrichment facilities.

The expanded nuclear declaration under Iran’s additional protocol will include more facilities

than are counted under Iran’s current comprehensive safeguards agreement –such as the uranium mines and heavy-water production plant. Iran’s additional protocol, once ratified, is

permanent. Iran voluntarily implemented it between 2003-2006, but did not ratify the document. The JCPOA requires Iran to seek ratification within eight years.

As part of the JCPOA, Iran will also implement modified Code 3.1 to its safeguards agreement. Under the terms of Code 3.1 Iran must notify the IAEA when it decides to build a nuclear facility (rather than simply six months prior

to introducing nuclear material) and provide updates on the design of existing nuclear facilities. This will give the IAEA additional warning if Iran intends to expand its nuclear program, and adjust the safeguards approach accordingly.

The IAEA’s ability to request access to undeclared sites to investigate concerns about illicit nuclear activity is also permanent under Iran’s additional protocol. Without the JCPOA, which ensures ratification of Iran’s additional protocol, the IAEA will have no mechanism to request access to undeclared nuclear sites to check for illicit activities.

Under the Model Additional Protocol, if the agency has concerns about a particular site the agency will provide that country with the reasons for its concerns. The country must then respond to the IAEA’s request. If the explanation does not satisfy the IAEA, it can request access to the site. Under its

additional protocol, Iran, like any other country, can take some steps to protect sensitive information if, for instance, the inspection is on a military facility. But ultimately, it is up to the IAEA

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to determine if the access is sufficient.

Under the Model Additional Protocol, the agency does not have to allow a country time to respond to evidence or concern if a “delay in access would prejudice the purpose for which the access is sought.” The IAEA can refer the case to its Board of Governors and the UN Security Council if it is unsatisfied with Iran’s compliance.

Permanent Restrictions: Iran also agreed to permanent restrictions prohibiting activities relevant to developing a nuclear explosive device under the JCPOA. While Iran committed not to pursue nuclear weapons when it joined the NPT, the JCPOA commits Iran to adhere to restrictions beyond its NPT obligations.

The NPT leaves open the option for peaceful nuclear test explosions and research or use of explosives suitable for nuclear weapons for non-nuclear purposes. In the past, Iran has asserted that some of the activities with possible military dimensions (PMDs) that the IAEA was investigating was for non-nuclear weapons purposes.

Under the deal, however, this loophole is permanently closed. Iran agreed to forgo computer modeling to simulate nuclear explosive devices, testing, developing, or acquiring multi-point explosives and neutron sources, and development and designing of nuclear explosive diagnostic systems (Annex I Section T). While some of these activities are relevant for developing conventional explosives and for activities like drilling, in the future, if caught conducting research in these areas, Iran will not be able to claim it is undertaking any of these activities for non-nuclear purposes.

The JCPOA also closes the door on the plutonium pathway to nuclear weapons indefinitely. As part of the deal, Iran said it never intends to reprocess spent fuel, the process by which weapons-grade plutonium is removed from spent reactor fuel. Iran also said it intends to ship out all spent fuel from any future reactors.

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Decrease Incentives: The JCPOA is a strong, verifiable, agreement from a nonproliferation viewpoint, but the United States, along with its P5+1 partners and countries in the Middle East, can and should take steps to further decrease Iran’s motivation and justification to significantly ramp up its enrichment capacity after 15 years.

Fuel Supply Guarantees: Civil nuclear cooperation between certain nuclear supplier states and Iran can and should be designed to ensure that Iran has assured access to the nuclear fuel for its research and power reactors so that Tehran has less of a “practical need” to significantly expand its uranium-enrichment program beyond the capacity allowed under the JCPOA for the first 10-15 years. Pursuing this strategy would prevent Iran from justifying increased enrichment capacity based on a need to domestically produce reactor fuel to ensure continuity of supply.

Under the terms of the JCPOA, Iran will domestically fuel the Arak reactor, once the reactor is modified and Iran is able to produce fuel assemblies for the reactor. Iran’s enrichment capacity under the first 10 years of the deal, 5,060 IR-1 centrifuges, is more than enough to provide

fuel for the reactor on an annual basis. Iran claims that it wants to provide fuel for its power reactor at Bushehr, which is currently supplied by Russia. That would require the equivalent of over 100,000 IR-1 centrifuges.

Any country that enters into a contract with Iran to supply additional power reactors could provide fuel supply guarantees for the lifespan of the reactor, and arrangements to take back the spent fuel so as to deny Iran access to the unseparated plutonium in the spent fuel. Iran’s current memorandum of understanding with Russia for the provision of additional power reactors at the Bushehr site already includes this kind of arrangement.

If necessary, to provide additional assurances that there will be no fuel supply disruption, Russia

could deliver to Iran enough fuel for several years at a time. Fuel could be stored under IAEA seal until it is used. China is also currently in discussions with Iran about supplying nuclear power reactors and should be strongly encouraged to ensure that any reactor contracts include lifetime fuel supplies and spent fuel removal arrangements. This example could be employed region-wide to decrease the incentives of other countries considering nuclear power programs from pursuing enrichment.

The United States and its P5+1 partners should also work to ensure that the IAEA fuel bank, is fully funded and supplied... The fuel bank is designed to ensure uninterrupted fuel supplies for nuclear reactors and prevent the withholding of fuel from supplier countries for political reasons. If for some reason Russia was unable or unwilling to supply Iran's reactors, Tehran could obtain nuclear fuel from the IAEA bank.

Strengthen Regional Norms:

Iran has stated in the past that it would be willing to accept permanent enrichment restrictions, such as capping enrichment levels at reactor grade (enriched to less than five percent U-235), if other countries in the region agreed to similar restrictions. A regional commitment to forgo enrichment to higher levels could serve as a major confidence building measure against further proliferation in the region. Another possible confidence building measure could be to encourage all states in the region to commit to continuous IAEA monitoring, similar to what Iran agreed to for its nuclear supply chain, on key nuclear facilities region-wide.

Another option for increasing regional confidence in the peaceful nature of Tehran's activities would be to "multilateralize" Iran's existing uranium-enrichment facility, providing regional oversight and nuclear fuel for countries pursuing nuclear

power in the Middle East. Regional countries that invest in the enrichment facility would be able to have their personnel access and monitor the facilities, thus providing a greater degree of confidence that Tehran's nuclear activities are peaceful and it could help prevent stockpiles of enriched uranium from accumulating in Iran.

Regional inspections could also provide greater transparency and assurance that Iran's nuclear program is peaceful. Brazil and Argentina, both of which pursued nuclear weapons programs and now have domestic uranium enrichment, have a bilateral inspections agreement known as the ABACC arrangement (Argentina-Brazil Agency for

Accounting and Control of Nuclear Materials), which augments the standard IAEA safeguards system for those states. Despite the checkered past of both countries in nuclear weapons research, the bilateral inspections help provide assurance that neither country is currently pursuing nuclear weapons.

Conclusion: While some of the restrictions on Iran's uranium-enrichment capacity expire

after 15 years, other measures remain in place, some of which are permanent. The United States, it P5+1 partners, and countries in the region also have a number of options to strengthen the deal and dis-incentivize Iran from ramping up its uranium enrichment 15 years after implementation of the JCPOA.

If Congress rejects the deal, Iran's nuclear program will be free of the long-term restrictions and more intrusive monitoring system mandated by the JCPOA. On the other hand, the JCPOA provides a solid formula for blocking Iran's ability to build nuclear weapons for at least 15 years, and the time necessary to pursue and implement complimentary initiatives to head off the possibility that Iran will try to pursue an expansion of its nuclear program over the long-term.

Source: Arms Control Association, 25 August 2015.

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OPINION – Tom Dennis

Congress Should Reject Nuclear Deal with Iran

President Barack Obama's refusal to abide by the spirit of that text is the first among many reasons why Congress should reject the administration's agreement with Iran. Our founding document is clear: Presidents do not have the power by themselves to commit the US to vital and controversial long-term agreements with other nations. Just as important, the president should not have that power. America's whole constitutional system is built on denying absolute power to any one branch, starting with the executive.

...That's true in this case as well. The president's decision to bypass the Senate has put the US in a very difficult circumstance. First, it has both deepened partisan divisions and put them on world display. Only days after reaching the agreement, Obama actually took it first not to the Senate but to the UNSC. By doing so, he showed contempt for Congress and our constitutional process.

That's not the way to win friends and influence people in the US Senate. Nor is it the way to impress other nations with America's bedrock constitutional strength. Second, the president now is confronting Congress with a terrible fait accompli. He's saying that the only choice the congressmen have is between his agreement and war.

If that's true, then as Harvard Law Professor Alan Dershowitz wrote, "perhaps one of the worst consequences of the negotiation and deal is that they put us in a position where rejecting a bad deal may be worse than accepting it." That didn't have to happen, for part of the reason why Iran conceded so little in the negotiations is that Obama negotiated from weakness, not strength. He ignored Congress. That meant he could speak on behalf of only the executive branch, not the full US government – not "the people."

Who would you rather negotiate against: a lame-duck president, or a national leader determined to reject any deal that couldn't win a two-thirds majority in the Senate? In July, a House Foreign Affairs Committee member asked Secretary of State John Kerry why the administration didn't seek a treaty. The answer, Kerry admitted, was expediency. "Well Congressman, I spent quite a

few years ago trying to get a lot of treaties through the United States Senate," Kerry replied. "And frankly, it's become physically impossible. That's why." But that's not the case at all. Even the George W. Bush administration – not one that was known for its cozy relations with Congress – won Senate approval for a full 163 treaties from 2001 to 2009.

The president could have declared his full support for the Senate's constitutional role, then used that leverage to drive the toughest possible deal with Iran. Instead, he snubbed the Senate completely. Senators needn't feel guilty about voting their consciences in return.

Source: <http://www.grandforksherald.com/>, 23 August 2015.

OPINION – Dennis Ross, David Petraeus

The Bite in the Iran Nuclear Deal

Many members of Congress continue to grapple with the nuclear deal with Iran – and so do we. Like us, the undecideds see its benefits: The deal would block the uranium enrichment, plutonium separation and covert paths to a nuclear bomb for the next 15 years. Compared with today, with an Iran that is three months from break-out capability and with a stockpile of 10 bombs' worth of low-enriched uranium, there can be little doubt that a deal leaves us far better off, producing a one-year break-out time and permitting the Iranians less than one bomb's worth of material for the next 15 years.

We also don't believe that if Congress blocks the deal, a better one is going to be negotiated. Will the other members of the P5+1 be ready to return to the table because Congress says no? Will they even know who defines the US position and what it is? We doubt it.

So if the deal...has clear benefits and there is no obvious negotiated alternative, why are we still undecided? Put simply, because the deal places no limits on how much the Iranians can build or expand their nuclear infrastructure after 15 years. Even the monitoring provisions that would continue beyond 15 years may prove insufficient as the Iranian nuclear program grows. And Iran's ability to dramatically increase its output of enriched material after year 15 would be

significant, as Iran deploys five advanced models of centrifuges starting in year 10 of the agreement.

In terms of the size of its nuclear program, Iran will be treated like Japan or the Netherlands – but Iran is not Japan or the Netherlands when it comes to its behavior. It is, after all, one of three countries designated by the United States as a state sponsor of terrorism. Perhaps in 15 years we will see a very different Iran – not a sponsor of terrorism, not a threat to its neighbors, not led by those who declare that Israel, another UN-member state, should be eliminated. But, while we hope that Iran may change, we cannot count on it.

The fact that President Barack Obama emphasizes that the plan depends on verification – not trust – also means that he is not assuming Iran will change. But verification means only that we can catch the Iranians if they cheat; what matters even more is that the Iranians recognize that they will pay a meaningful price when we catch them. In other words, deterrence is the key to ensuring not just that the Iranians live up to the agreement, but also to preventing them from developing nuclear weapons. Iran must know that we will not permit it to become a nuclear weapons state ever.

Now is the time to make it clear that there will be a firewall between Iran's threshold status and its having a nuclear weapon. Now is the time for the Iranians and the world to know that if Iran dashes toward a weapon, especially after year 15, that it will trigger the use of force. At that point, it would be too late for sanctions to pre-empt an Iranian nuclear fait accompli.

It is critically important for the president to state this clearly, particularly given his perceived hesitancy to use force. Indeed, were Obama to be unequivocal about the use of force should Iran

violate its commitment not to seek nuclear weapons, the international community would accept the legitimacy of military strikes in response.

In a letter to Rep. Jerrold Nadler, D-N.Y., Obama takes account of the importance of deterring Iran "from ever obtaining a nuclear weapon." Even more significant, he says his administration "will take whatever means are necessary...including military means" to prevent Iran from acquiring nuclear weapons.

That is an important statement, but it is followed by devaluing language: "Should Iran seek to dash toward a nuclear weapon, all of the options available to the United States – including the military option – will remain available through the life of the deal and beyond."

Surely if the Iranians are dashing toward a weapon, especially after year 15, there is a need not to speak of our options but of our readiness to use force. The threat of force is far more likely to deter the Iranians. The Iranians also should

know that if they produce highly enriched uranium – for which there is no legitimate civilian purpose – that we would see that as an intention to make a weapon and would act accordingly. There is no mention of highly enriched uranium in the president's letter. Although Obama speaks in the letter of providing the Israelis with the BLU-113, a 4,400-pound "bunker buster" bomb, it

would not be sufficient to penetrate Fordow, the Iranian enrichment site built into a mountain. For that, the Israelis would need the 30,000-pound massive ordnance penetrator (MOP) and the means to carry it. While some may question whether we would act militarily if the Iranians were to dash to a bomb, no one questions whether the Israelis would do so.

Bolstering deterrence is essential in addressing key vulnerabilities we see in the deal. A blunter statement on the consequences of Iran moving

In terms of the size of its nuclear program, Iran will be treated like Japan or the Netherlands – but Iran is not Japan or the Netherlands when it comes to its behavior. It is, after all, one of three countries designated by the United States as a state sponsor of terrorism. Perhaps in 15 years we will see a very different Iran.

Bolstering deterrence is essential in addressing key vulnerabilities we see in the deal. A blunter statement on the consequences of Iran moving toward a weapon and of producing highly enriched uranium would allay some of our concerns. Providing the Israelis the MOP and the means to carry it would surely enhance deterrence.

toward a weapon and of producing highly enriched uranium would allay some of our concerns. Providing the Israelis the MOP and the means to carry it would surely enhance deterrence – and so would developing options now in advance with the Israelis and key Arab partners to counter Iran's likely surge of support for Hezbollah and other Shiite militias after it gets sanctions relief.

Deterrence would be more effective – and full implementation of the agreement more likely – if the Iranians understand that there will be a price for every transgression, no matter how small, and that we will raise the cost to them of de-stabilizing behavior in the region. The president's letter to Nadler was useful, but it fell short of addressing our concerns. It is still possible for the administration to do so.

Source: Dennis Ross, was special assistant to President Obama for the Middle East and South Asia from 2009 to 2011. David Petraeus was director of the CIA from September 2011 to November 2012. <http://www.commercialappeal.com/>, 29 August 2015.

OPINION – Alex Wellerstein

Five Ways that Nuclear Weapons Could Still be Used

On August 6, 1945, the first atomic bomb to be used in anger detonated over the city of Hiroshima, Japan. Three days later it was Nagasaki's turn. That was the last such attack. Despite the worst of the Cold War's close calls, such as the Cuban missile crisis, no other nuclear weapons have ever been used outside of testing. Seven decades later it is worth asking: could it happen again? Here are five possible nuclear use scenarios.

Major Power Nuclear War: During the Cold War the most likely scenario seemed to be a conflict between the US and the Soviet Union, each of which possessed many thousands of nuclear weapons. Three other countries eventually entered into the "nuclear club" as well, developing relatively large, sophisticated arsenals with global reach. Today, the idea that the US, Russia, UK, France or China would start a nuclear war seems considerably more remote than it once was.

The US and Russia still possess thousands of weapons each, with the other three nations possessing arsenals in the hundreds. Tensions over regional affairs, such as the fighting in Ukraine, always carry the threat of spilling over into larger conflicts. War strategists call this possibility "escalation", where one side, perhaps without realizing it, pushes the other side into a slightly larger response, which leads to another response, and so on until – at its very worst – a full nuclear exchange, the sort of thing that can kill millions.

None of these powers wants this sort of thing to happen – it's not in their interest to be mutually annihilated, and their arsenals are sophisticated enough that nobody thinks they could get away with a sneak attack without fearing reprisal. Despite sometimes having blistering rhetoric, they take pains to avoid it. Could it still happen? It's not impossible. But it's probably not as likely to happen today as it might have in the 1960s or 1980s, when tensions were at their highest.

Minor Power Nuclear War: What about the other nuclear powers, whose arsenals are smaller and who do not yet quite have global reach? Into this category we might put India, Pakistan, Israel and North Korea. Could two of these nations wage war against one another? The scenario that has kept experts up at night for a long time has been that of a "nuclear exchange" between India and Pakistan, whose proximity, comparable nuclear arsenals and long history of disagreements make their situation seem especially dangerous. Notably, they also have different nuclear doctrines: India, with its large conventional army, has indicated it would not use nuclear weapons first, but Pakistan has indicated that in the event of an overwhelming conventional attack, it may feel sufficiently threatened to go nuclear.

These sorts of "asymmetries" make nuclear works anxious, because it means that each side has a different "red line", and the other side may not know exactly where that line is drawn. For many experts, something involving smaller nuclear powers might be the most likely scenario on this list for a significant nuclear exchange. Lest anyone

who doesn't live in these regions think that this is not something to worry about, scientists have run models that have concluded that even a relatively "minor" exchange of only a few hundred weapons, aside from killing millions in the region in question, might alter the global climate in such a way as to drastically reduce crop production.

Nuclear Weapons State vs Non-nuclear State: Could a nuclear weapons state, minor or major, use such a weapon against a non-nuclear power?

It's obviously not impossible: the only time that nuclear weapons were ever used in war so far was one nuclear power with very few weapons (the US) against a non-nuclear power (Japan). In terms of major nuclear weapon powers, it seems unlikely that the states today with large conventional militaries would think nuclear weapons were worth using. But what about states that are more vulnerable, with smaller militaries? One might worry, say, about a war between Israel and its neighbours, or North Korea against South Korea. The tricky thing here is that with these states, the non-nuclear powers might not know where that line might be drawn for the states with the bomb. Again, these kinds of "asymmetries" might make the chance for misunderstanding high.

Nuclear Terrorism: Since the late 1960s, people have worried about the possibility that a group of terrorists ("non-state actors") might acquire nuclear weapons. The ability to natively produce the nuclear fuel for a bomb (enriched uranium or separated plutonium) is still restricted only to entities the size of states, though the technical requirements have decreased over the years. But it is unlikely for the moment that any terrorist group, even one with significant resources, would be able to muster the technical and industrial expertise necessary to produce the fuel themselves. Could a terrorist group steal the fuel? Potentially.

For many years after the fall of the Soviet Union, there were concerns that Russian supplies of bomb-grade uranium and plutonium might be vulnerable to theft or diversion. There are no concrete indications that this has occurred, but the record-keeping for this period was so poor that it's not clear that anybody would be able to tell if it had taken place. The situation today is considerably better, though the physical security around the plants that create and store these materials has often left a lot to be desired. As recently as 2012, for example, a group of peace activists (including an 82-year-old nun) managed to break into the American "Fort Knox" of enriched uranium.

Could a terrorist group steal the fuel? Potentially.

Would a state give weapon-grade fuel, or a full weapon, to a terrorist organisation? This is usually judged as not particularly likely, as scary as it sounds. In the event of a terrorist nuclear detonation, scientists would likely be able to determine the origin of the nuclear fuel in the bomb, since every plant that makes nuclear fuel has slight differences in its product output, and these can be detected even in the wake of an explosion.

Could a terrorist organisation steal an intact weapon?

Many nuclear weapons today are kitted out with sophisticated electronic locks that would prevent their being used, or tampered with, by anyone lacking the proper codes. In theory, these kinds of countermeasures would make it very hard to use a stolen nuclear weapon, even if the heist could be pulled off.

Accidental Nuclear Detonation: Could a nuclear weapon created by a nuclear state accidentally go off? In the 1950s and 1960s, the US had dozens of "near misses", such as bombs that crashed with planes, or fell out of planes, or caught fire for extended periods of time. Could such an occurrence result in a significant nuclear yield?

Terms of major nuclear weapon powers, it seems unlikely that the states today with large conventional militaries would think nuclear weapons were worth using. But what about states that are more vulnerable, with smaller militaries? One might worry, say, about a war between Israel and its neighbours, or North Korea against South Korea.

With older generations of weapons, it was not as unlikely as we'd like to think. Many of these bombs were not designed with long-term safety as their primary consideration. Later generations of warheads were built so that the chance of an accident producing a nuclear explosion would be exceedingly rare. But we know very little about the weapon designs of most states, and whether they prioritise safety better than the US used to in its older designs.

Taking these scenarios all together, how likely is it that the world will once again see a nuclear weapon used against a city? If we live in a world with nuclear weapons, there will always be a risk greater than zero of "it" happening again. This worrisome uncertainty is one of the truths of the nuclear age and there is no easy way around it. Even attempting to get rid of all nuclear weapons might not resolve such a fear entirely – after all, it is always possible that a state might keep a very small stockpile of nuclear fuel hidden, just in case.

The threat of nuclear war was, for many decades, the primary existential threat to humanity. Today, it has probably been dethroned by the threat of man-made climate change. But the uncertainties are still high enough that nobody should feel too comfortable about a world with more than 10,000 nuclear weapons, even if things are probably not as bad as they once were. Nuclear war is no longer at the very top of the list of things to worry about – but it's still on the list.

Source: <http://gulfnews.com/opinion/thinkers/five-ways-that-nuclear-weapons-could-still-be-used-1.1575481>, 30 August 2015.

OPINION – Beenish Altaf

Nuclear Game in South Asia

Deterrence in South Asia has faced many challenges in its progression exactly in the same manner as the US and Russian deterrence evolution faced during the Cold War. The concept

of deterrence in South Asia in the late 1990s has been modified in the contemporary arena according to the ongoing security and political architecture of South Asia. As a matter of fact, the security dilemma in the South Asian region has maneuvered as a chain reaction that includes regional and extra-regional powers with competing interests, such as China, India and Pakistan respectively. While shaping eventual policy direction in this regard, the perceived national interests of each state are of great importance.

For that reason, there were various national and international factors behind the evolution of the Indian nuclear programme. India's reservations about its neighbouring state, nuclear-armed China, and its quest for great power status have proven to be powerful incentives. On the other hand, Pakistan's uneasy and troubled relationship with India explicates its possession of nuclear weapons. Initially, the endeavour was just to generate a deterrence equation with its nuclear archrival, India. At that point, only one nuclear weapon was considered adequate enough to deter the adversary, effectively guaranteeing the deterrence stability of the counterpart.

However, later India formulated its new doctrinal policy as the Indian Proactive Strategy, formally termed as the Indian Cold Start Doctrine, which was designed to respond to any alleged or superficial threat from its western rival. Pakistan, in contrast, has come up with its own new war-fighting concept that envisages rapid deployments of conventional forces, coupled with introducing short range TNW to achieve strategic effects. Factually, following the conventional asymmetry between India and Pakistan, Pakistan considered the need to develop TNWs in order to balance out the conventional threat posed by the high number of conventional weapons in India. By this, the evolution of conventional deterrence commenced in South Asia after which Pakistan's concerned

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officials quite often stated that Pakistan would continue to test and upgrade its TNWs so as to balance out superior conventional asymmetry.

According to Bernhard Brodie, a nuclear bomb is a weapon of peace and not a weapon for use (super bomb). So, nuclear deterrence is all about war avoidance and is not a war-fighting strategy. Brigadier (ret'd) Samson Simon Sharaf, a political economist and a television anchorperson, called deterrence a cost-benefit analysis of the gains and losses in credible, capable and hostile environments, with a common and well-understood strategic concept and language between adversaries warranting a constant appraisal of capabilities and vulnerabilities.

Deterrence in South Asia has faced many challenges in its progression exactly in the same manner as the US and Russian deterrence evolution faced during the Cold War. Regarding the changing dynamics of deterrence in South Asia, Pakistan's fear of becoming vulnerable to a first strike (and/or a desire to attain first-strike capability) gives technology a central role in deterrence and tends to fuel a high-intensity qualitative arms race. Pakistan has to develop and adopt effective controls on the graduated escalation ladder both in conventional and nuclear forces to retain the initiative of nuclear retaliation.

Paradoxically, the number of nuclear weapons enough to maintain/ensure nuclear deterrence continues to trouble nuclear deterrence theorists, strategists and policymakers in the post Cold War period alike. Meanwhile, the world's nuclear weapons' stockpile is estimated to be at 16,300 and all the nuclear armed states, in one way or the other, are constantly modifying and

modernising their nuclear inventories. No state will place a number or cap at what it considers to be a sufficient nuclear force for credible deterrence.

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sufficient to deter mainly China and Pakistan, Pakistan maintains that it seeks a deterrent 'equilibrium' with India and not 'nuclear parity' with India.

While analysing the South Asian deterrence discourse with the western model of deterrence the first and foremost thought is that like the western perception the use of warfare, according to the strategic cultures of India and Pakistan also, is not well thought-out as a foreign policy tool. This might be one of the reasons that both nuclear, antagonistic neighbours are not seriously taking steps for doctrinal preparations and crisis management for a supposed limited nuclear escalation. One has to take into account here that it does not matter how the adversary perceives the signals (as weak or strong), it is a key to success in the nuclear signaling game.

Hence, the deterrence discourse depends on the strategic behaviour of the state as to how one perceives and what measures it adopts to the supposed threat. "Thus, the strategic behaviour of states engaged in nuclear rivalries tends to be schizophrenic, treating nuclear weapons sometimes as revolutionary and sometimes as

In South Asia, India and Pakistan, nuclear weapons' possessing neighbours and adversaries have estimated nuclear weapons' stockpiles of 90 to 110 and 115 to 120, respectively (according to estimates from the SIPRI Yearbook 2014 and the Bulletin of Atomic Scientists). Both countries have made policies of minimum nuclear deterrence and a no-nuclear arms race. While India seeks to maintain a nuclear force

The strategic behaviour of states engaged in nuclear rivalries tends to be schizophrenic, treating nuclear weapons sometimes as revolutionary and sometimes as conventional." Nevertheless, apart from the altering nature of deterrence, it is the only effective key to avoid conflict and potential escalation to nuclear war.

conventional." Nevertheless, apart from the altering nature of deterrence, it is the only effective key to avoid conflict and potential escalation to nuclear war that safeguards deterrence stability.

Source: *The writer is associated with the Strategic Vision Institute, <http://www.dailytimes.com.pk/>, 27 August 2015.*

NUCLEAR STRATEGY

CHINA

China conducted a flight test of its new intercontinental ballistic missile (ICBM) this month. Bill Gertz reported that earlier this month, China conducted the fourth flight test of its DF-41 road-mobile ICBM. "The DF-41, with a range of between 6,835 miles and 7,456 miles, is viewed by the Pentagon as Beijing's most potent nuclear missile and one of several new long-range missiles in development or being deployed," Gertz reports.

This is the fourth time in the past three years that China has tested the DF-41, indicating that the missile is nearing deployment. Notably, according to Gertz, in the latest test China shot two independently targetable warheads from the DF-41, further confirming that the DF-41 will hold MIRV.

China's acquisition of a MIRVed capability is one of the most dangerous nuclear weapons developments that no one is talking about. MIRVed missiles carry payloads of several nuclear warheads each capable of being directed at a different set of targets. They are considered extremely destabilizing to the strategic balance primarily because they place a premium on striking first and create a "use em or lose em" nuclear mentality.

Along with being less vulnerable to anti-ballistic missile systems, this is true for two primary reasons. First, and most obviously, a single MIRVed missile can be used to eliminate numerous enemy nuclear sites simultaneously. Thus, theoretically at least, only a small portion of an adversary's missile force would be necessary to completely eliminate

one's strategic deterrent. Secondly, MIRVed missiles enable countries to use cross-targeting techniques of employing two or more missiles against a single target, which increases the kill probability.

In other words, MIRVs are extremely destabilizing because they make adversary's nuclear arsenals vulnerable to being wiped out in a surprise first strike. In the case of China, Beijing's acquisition of a MIRVed capability is likely to force India to greatly increase the size of its nuclear arsenal, as well as force it to disperse its nuclear weapons across a greater swathe of land to prevent China from being able to conduct a successful decapitation strike. Such a development in Delhi would upset the Indo-Pakistani nuclear balance, likely prompting Islamabad to take corresponding actions of its own.

China's acquisition of a MIRVed capability is also likely to upset the strategic balance with Russia. As Moscow's conventional military capabilities have eroded since the fall of the Soviet Union, Russia has leaned more heavily on nuclear weapons for its national defense. It therefore seeks to maintain a clear nuclear advantage over potential adversaries like China. Beijing's acquisition of MIRVed missiles threatens to erode this advantage.

The US intelligence community believes that the DF-41 will ultimately be able to carry up to 10 nuclear warheads. Such a development would likely force China to increase the size of its nuclear arsenal. To date, China and India (as well as the world's other nuclear powers) have maintained relatively small nuclear arsenals compared with Russia and the United States. The introduction of MIRVed technologies into the Asian nuclear balance may render this no longer true. For this reason – along with its long-range and solid fuel – the DF-41 is the most dangerous nuclear weapon in China's arsenal.

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Source: Excerpted from article by Zachary Keck. <http://nationalinterest.org/blog/the-buzz/china-tests-its-most-dangerous-nuclear-weapon-all-time-13626>, 19 August 2015.

UK

Thousands of Jobs Created as Britain's Nuclear Submarine Base Gets £500b Upgrade

Britain's nuclear submarine base is to have a £500 billion upgrade creating thousands of jobs. New ship lifts, sea walls and jetties will be built at Faslane in Scotland, where the Vanguard boats carrying the UK's Trident missiles are based. The 10-year project has angered the Scottish Nationalists, who want Trident to be scrapped. The Government has not yet decided on how to replace the four ageing Vanguards.

Faslane currently hosts 6,700 military and civilian staff and contractors, and ministers believe today's announcement will create thousands more jobs. Faslane would be the base for the new submarines.... But the SNP's defence spokesman Brendan O'Hara said: "George Osborne is essentially pre-empting a vote and actual decision on the renewal of Trident." It comes as engineers reveal how Navy ships could look in decades to come.

Dreadnought 2050 design includes a new-style operations room allowing commanders to focus on areas thousands of miles away. Engineers believe the warship could be manned by a crew of around 50 - down from 200 on modern vessels.

Source: <http://www.mirror.co.uk/news/uk-news/thousands-jobs-created-britains-nuclear-6353025>, 31 August 2015.

BALLISTIC MISSILE DEFENCE

RUSSIA

Russia Successfully Test Fires Topol Ballistic Missile

The RS-12M Topol (NATO reporting name SS-25 Sickle) is a single-warhead intercontinental

ballistic missile that has a maximum range of 10,000 kilometers (6,125 miles) and can carry a nuclear warhead with a yield of up to 550 kilotons. The launch of the RS-12M Topol missile was carried out from the Kapustin Yar testing range in southern Russia's Astrakhan Region, according to the statement. "The simulated warhead hit a designated target at the Sary-Shagan test range [in Kazakhstan] with pre-programmed precision," the press service said.

Source: <http://sputniknews.com/>, 22 August 2015.

NUCLEAR ENERGY

CHINA

China's Nuclear Boom

Nuclear power in Asia is hit or miss. Reactors in Japan are crawling to begin restart procedures for all but two of their shut down nuclear power plants, while others are building reactors at record speed. Even more countries want to supply reactor technology or other products and services to establish international ties or help keep their business afloat as their home countries delay or end any nuclear ambitions.

Asia is a land that is quickly growing population-wise, and the rate it is building nuclear power plants is running the same. The OECD Asia region is expected to have a population of 204 million in 2015, and 203 million by 2020, according to the US EIA's Outlook 2014. Of that total, Japan is expected to have a population of 125 million by 2020, down 1.5 percent from 2015. South Korea's population is expected to even out at 49 million, according to the EIA's data.

In non-OECD countries, population is expected to increase from 3.8 billion in 2015 to 4 billion by 2020. China will account for 1.38 billion of that in 2015 and 1.41 billion in 2020. India's is 1.3 billion in 2015 and 1.38 billion over the next five years. The nuclear plants will help the region to keep up with an expected explosion in electricity demand.

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According to Generation Hub, China is expected to surpass the US as a nuclear power generating leader within the next quarter century.

The country plans to increase its nuclear capacity from 23 GW to 58 GW by 2020, with an additional 30 GW under construction, according to data from the World Nuclear Association (WNA). The government hopes to have 15 percent of overall energy consumption from non-fossil fuel sources by 2020, and 20 percent by 2030, according to data from the EIA. Why is it that China has not let Fukushima affect it as much as other countries have? We take a look at how China is using nuclear to help ease growing pains and make cuts to emission levels.

The government budgeted \$600 billion to upgrade its power grid, according to the WNA. IAEA says nuclear contributed 2.4 percent of the total production in 2014, or 123.8 billion kWh. China led the US in total net electricity generation in 2012 with 4.8 billion kilowatt-hours of generation, according to data from the EIA. That was up from 4.5 billion kWh in 2011.

China has also had success in building an indigenous nuclear program starting with the development and deployment of its 1,400-MW CAP1400 PWR designed by the State Nuclear Power Technology Corp. (SNPTC) and Shanghai Nuclear Engineering Research and Design Institute (SNERDI). The reactor is based on the design of Westinghouse's 1,100-MW AP1000 two-loop PWR, which the SNPTC made the main basis of technology development in China. There are two new builds in China that are also using the AP1000 design: The dual-unit Sanmen and the six-unit Haiyang nuclear projects. CNEA estimated in May 2013 that the construction cost for two AP1000 units at Sanmen are CNY 40.1 billion (\$6.54 billion), or 16,000 Yuan/kW installed (\$2,615/kW), instead of CNY 32.4 billion earlier estimated. The price tag is expected to decrease to about CNY 13,000/kW as more construction and localization is achieved.

Based off the Westinghouse AP1000 design is the China Advanced Passive 1400 (CAP1400) technology, an APWR. There are two currently under construction at the Shidaowan 1 & 2 plant

site. China General Nuclear designed the 1,080-MW ACPR1000 reactor, which recently broke ground at the Hongyanhe 6 project site. The unit had to undergo additional safety checks and licensing after the March 2011 Fukushima accident. CGN received the approval from the National Development and Reform Commission on March 10 to build units 5 & 6, according to WNA. SNPTC, in addition to designing the CAP1400, started the pre-study of the CAP1700 reactor.

Agreements between SNPTC and Westinghouse say that SNPTC would own all intellectual property rights for any derivatives over 1,350 MW, WNA said. SNPEC is performing the engineering with a team from SNERDI, the Shandong Electric Power Engineering Consulting Institute, and the State Nuclear Power Equipment Manufacturing Co.

Prior to 2008, the government had planned to increase nuclear generating capacity to 40 GW by 2020 (out of a total 1000 GW planned), with a further 18 GW nuclear being under construction then, according to WNA. After the Fukushima accident, and due to increased projections for nuclear power, the State Council in October 2012 set the target for 60 GW by 2020, with 30 GW under construction. The first of two reactors at the Taishan power project are expected to be completed by year-end.

By around 2040, installation of PWRs is expected to level off at 200 GW and fast reactors progressively increase from 2020 to at least 200 GW by 2050 and 1400 GW by 2100, WNA said. The National Nuclear Safety Administration (NNSA) under the China Atomic Energy Authority (CAEA) is the licensing and regulatory body that also maintains international agreements regarding safety. It reports to the State Council directly. In relation to the AP1000, NNSA works closely with the US Nuclear Regulatory Commission, said the WNA.

NNSA is responsible for licensing all nuclear reactors and other facilities, safety inspections and reviews of them, operational regulations, licensing transport of nuclear materials, waste management, and radiation protection. It is responsible for environment impact assessment

of nuclear projects. The licensing approval process starts at the approval of siting, then the construction permit, which is usually issued 12 months before the first concrete is poured. Next is the permit for fuel loading, then approval and issuance of the operating license.

Though China has obviously pushed forward with new builds, the Fukushima accident did slow down progress for a bit. The State Council announced five days after the March 11, 2011 accident that it would suspend approvals for new nuclear plants and begin safety checks of both

operational and planned nuclear plants. The council also suspended work on four approved units due to start construction the same year. Two of those projects-Fuqing 4 and Yangjiang 4-began construction in late 2012. WNA data says inspections of the operating plants took three months, and inspections of planned units were completed by October 2015.

China has also taken major steps in achieving high safety standards. China has hosted 12 Operational Safety Review Team missions from the International Atomic Energy Agency (IAEA) to October 2011, and each power plant has had one external safety review every year through OSART, the WANO peer review, and peer reviews from the Canadian National Energy Alliance in partnership with the Research Institute for Nuclear Power Operations, according to WNA. The NNSA is also part of the ASEAN+3 Forum on Nuclear Safety.

Nuclear work in China does not appear to be slowing anytime soon, especially with a growing supply chain and aggressive plans for more power generation in the nation. The country is open for business, and other nations are looking to partner on projects. It's no wonder that publications and industry groups have said China is a leader when it comes to building new reactors.

Source: Sharryn Dotson, <http://www.power-eng.com/>, 25 August 2015.

GENERAL

ARC Reactor Design Uses Superconducting Magnets to Draw Fusion Power Closer

China has hosted 12 Operational Safety Review Team missions from the International Atomic Energy Agency (IAEA) to October 2011, and each power plant has had one external safety review every year through OSART, the WANO peer review, and peer reviews from the Canadian National Energy Alliance in partnership with the Research

Fusion power can seem a bit like the last bus at night; it's always coming, but never arrives. MIT is working to change that with a new compact tokamak fusion reactor design based on the latest commercially available magnetic superconductor technology. The ARC (affordable, robust, compact) reactor design promises smaller, cheaper reactors that

could make fusion power practical within 10 years.

A commercially viable fusion reactor has been the Holy Grail of engineering since the 1950s, with the potential to turn almost all other major electricity sources into an historical footnote overnight. If perfected, it would essentially be an inexhaustible source of power, impacting on almost every aspect of life, from the environment to global politics. The trick is making it practical.

...There are a number of fusion reactor designs, but one of the most promising is the tokamak reactor, which is a hollow metal chamber shaped like a donut twisted into a figure eight. Inside the chamber is a vacuum into which hydrogen isotopes deuterium and tritium are introduced. These are superheated to the temperature of the Sun's interior forming plasma that is contained and compressed by powerful magnetic fields.

The magnetic coils responsible for producing these magnetic fields are key to the whole process and the biggest bottleneck to progress.

An international consortium, including scientists from the EU, India, Japan, China, Russia, South Korea, and the US, is planing to build the world's most powerful fusion reactor based on a tokamak.

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Work began on the ITER in 1985, and at an estimated cost of US\$40 billion, it isn't slated to start full operations until 2027. Even then, it will be on a purely experimental basis.

...MIT's ARC reactor is an example of how a single change can completely alter the design of a system. It uses new commercially available superconductors made of rare-earth barium copper oxide (REBCO) superconducting tapes that are capable of producing high-magnetic field coils. The stronger magnetic fields generated by these coils do a better job of confining superhot plasma, so the reactor can be smaller, cheaper and take less time to build.

Intended for basic fusion power research, the ARC reactor is based on the same physics as ITER, though the team also describes it as a potential prototype plant that could generate significant amounts of power. According to MIT, the equations governing reactor design show that power output increases to the fourth power of the increase in the magnetic field. In other words, double the strength of the field and the power goes up 16 fold. The new superconductors being used by MIT should increase fusion power by a factor of 10 over standard superconducting technology, with knock-on effects for reactor design.

With a major radius of 3.3 m (10.8 ft) and a minor radius of 1.1 m (3.6 ft), the ARC is a 500 MW reactor that is half the diameter of ITER, but will boast a similar power output. Also, the new superconducting magnets will allow for a steady power output, while today's experimental reactors can only operate for a few seconds at a time before their copper coils overheat.

MIT has also designed the ARC reactor so that the fusion power core can be removed without needing to dismantle the reactor, which is a big plus for a research reactor. In addition, the solid cladding normally wrapped around the fusion chamber has been replaced with a circulating liquid. This eliminates the need to replace the cladding as it degrades, since the liquid can simply be replaced.

The researchers say the current design could generate three times more energy than is fed into

it to keep it running, but they are hopeful of boosting this to five or six times in the future. Since no current fusion reactor can maintain even a sustained break even point, this would be a major breakthrough. The team says reactors like the ARC have been built in about five years, and that their design could generate electricity for about 100,000 people.

Source: <http://www.gizmag.com/>, 16 August 2015.

PAKISTAN

PM Nawaz Inaugurates K-2 Power Plant at Kanupp

PM Nawaz Sharif inaugurated the K-2 power project at the Karachi Nuclear Power Plant (Kanupp) during his one-day visit to Karachi. K-2 power plant, the largest in the country, will generate 1,100MW electricity upon completion. Nawaz congratulated the Pakistan Atomic Energy Commission on the timely start of concrete pouring of K-2 power plant, which will be built by the China National Nuclear Corporation (CNNC)....

..."The construction of K-2 and K-3 power plants will further strengthen the steadfast friendship between the two nations," Nawaz said. The PM thanked the Chinese government, CNNC, and other Chinese organisations for their cooperation in the construction of nuclear power plants. He said it was a matter of pleasure that with the cooperation of a Chinese company two more nuclear power plants – Chashma-III and IV – would start producing 630MW electricity in 2016....

The World Nuclear Association had earlier estimated the cost of the new project at nearly \$10 billion. The project had been in the media spotlight for quite some time with representatives of civil society organisations raising a number of reservations over it, with the chief concern being the close proximity of the project to the city.

Source: <http://www.dawn.com/>, 21 August 2015.

SOUTH AFRICA

South Africa's ANC Voices Caution on Nuclear Power Plan

South Africa's ruling African National Congress called for a "full, transparent and thorough cost benefit analysis of nuclear power," as the country

prepares for a bidding process to build nuclear plants. In a document that will be discussed at its policy review conference in October 2015, the party showed its first signs of caution as President Jacob Zuma's government gets ready to award contracts this year to build nuclear plants that will generate 9,600 megawatts....

Russia's state-owned Rosatom Corp., Areva SA, EDF SA, Toshiba Corp.'s Westinghouse Electric Corp., China Guangdong Nuclear Power Holding Corp. and Korea Electric Power Corp. have shown an interest in bidding for the project, which may cost as much as \$100 billion.

With South African power demand now expected to be less than previously forecast in 15 years, the country will only need more nuclear power after 2025 and could abandon it altogether if other sources of energy are sufficient, Johannesburg-based Business Day newspaper reported, citing an amendment to the government's Integrated Resource Plan for 2010-2030, which was never published. In its policy document, the ANC called on the government to further explore the "enormous" hydropower and gas power options in the region and to improve its planning for energy generation.

Source: <http://www.bloomberg.com/>, 18 August 2015.

NUCLEAR COOPERATION

CHINA-IRAN

China to Modernize Iran's Arak Nuclear Reactor, Make New Plants

Iran and China have agreed to cooperate on modernizing Arak nuclear reactor. During a

meeting between Ali Akbar Salehi, head of the Atomic Energy Organization of Iran (AEOI) and Qian Zhimin, president of the CNNC in Beijing on 27 August 2015 the sides also agreed to increase cooperation for construction of nuclear power plants, the Iranian official IRNA news agency reported.

...Tehran and Beijing agreed on a two-step process of cooperation. Based on that, power plants with a capacity

of 8-megawatts will be constructed in the mid-term. Long-term, capacity is planned to increase to 20,000 MW in the second phase of the cooperation.

The Chinese part also expressed readiness to supply Iran with modern technology to redesign

Arak heavy water nuclear reactor for producing radiopharmaceuticals as well as other industrial nuclear products. The reactor's redesign is necessary based on the nuclear deal which was signed between Tehran and the P5+1.... The deal once implemented is expected to curb Iran's nuclear program in exchange for the lifting of most international sanctions....

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Source: <http://en.trend.az/>, 27 August 2015.

CHINA-RUSSIA

Russia, China May Cooperate on Floating Nuclear Power Plants Construction

Moscow and Beijing may build floating nuclear power plants for third countries together, Russia's deputy prime minister said. Russia and China may join efforts in construction of floating nuclear power plants in third countries, Russian Deputy Prime Minister Dmitry Rogozin said on ... "We and Chinese colleagues are trying to determine the potential markets [for the project's realization],"

Rogozin told Rossiya....

Source: <http://www.turkishweekly.net/>, 25 August 2015.

RUSSIA-IRAN

Russia Plans to Supply Fuel to Iranian Nuclear Plant this Month

Russia's state nuclear company said it was planning to supply new fuel to Iran's controversial Bushehr nuclear power plant before the end of the August 2015, moving quickly to keep power supply from the plant flowing. ...Russia has been Iran's partner in developing its nuclear energy plant at Bushehr, on Iran's Arabian Gulf coast, having taken over from German firms to complete the protracted project and bring the first reactor online in 2011.

TVEL, the nuclear fuel-making unit of Russia's Rosatom, said that last month's (July) deal on sanctions cleared the way to reestablish a banking relationship with the Atomic Energy Organisation of Iran, the joint operator of Bushehr with the Russians, thus allowing TVEL to restart nuclear fuel deliveries.... "Loading of fresh fuel with the presence of international experts during a planned maintenance of the plant is scheduled for September." TVEL said Russia's support of Bushehr, the first nuclear plant to go online in the Middle East, "serves as a benchmark for the further development of a peaceful nuclear energy production across the region".

Source: Anthony McAule, <http://www.thenational.ae/>, 26 August 2015.

NUCLEAR PROLIFERATION

NORTH KOREA

North Korea is Stepping Up Uranium Production

North Korea has been stepping up its capacity to mine and mill uranium, new satellite imagery

shows, raising fears that Kim Jong Un's regime is trying to expand its stockpile of nuclear weapons. The images show that a major mill that turns uranium ore into yellowcake, a first step toward enriching uranium, has recently been refurbished, said Jeffrey Lewis, director of the East Asia nonproliferation program at the Middlebury Institute of International Studies at Monterey.

"Pyongyang appears to be modernizing a key facility associated with the production of uranium yellowcake." Lewis wrote in a new report for 38 North, a Web site run by the US-Korea Institute at the Johns Hopkins School of Advanced International Studies. The facility is near a uranium mine outside Pyongsan, in the south of the country near the border with South Korea.

"This suggests that North Korea intends to mine and mill a significant amount of uranium that could serve as fuel for expanding its nuclear weapons stockpile," Lewis wrote. However, he added that the fuel could also be used in light-water reactors, which generate electricity, which North Korea may be planning.

As with all reports about North Korea's nuclear program, the latest study is impossible to verify. But Lewis is a respected nonproliferation expert, and

other recent reports have also suggested a renewed uranium processing push. In a separate report, *IHS Jane's*, said its analysis of satellite imagery suggests that North Korea is now running a second hall of uranium-enrichment centrifuges at its Yongbyon fuel fabrication plant, north of Pyongyang.

Using commercial satellite imagery, Lewis analyzed the layout of the uranium mine and mill near Pyongsan, believed to be the most important in North Korea. The mine is connected to the mill by a conveyor belt that brings uranium ore into the mill for processing. The mill is connected to a large pond where tailings, the waste products of

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uranium processing, are dumped. While it is difficult to estimate how much uranium has been processed, Lewis was able to conclude that North Korea seems to be accelerating uranium production.

“Since 2013, most of the buildings have received new roofs. The terminus of the conveyor belt was demolished and rebuilt,” he wrote in the report. “Other buildings appear to have been gutted and are now in the process of being rebuilt with new roofing. The significant investment in refurbishing the mill suggests that North Korea is expecting to process significant amounts of uranium, either from the Pyongsan mine or other uranium mines.”

The uranium produced at Pyongsan could be used at North Korea’s main nuclear site at Yongbyon, the focus of American denuclearization negotiations. ... Analysts have also speculated that it could be home to a uranium-based nuclear weapons program. IHS analysts noted that the snow on the roof of a second centrifuge hall at Yongbyon had melted over the winter, suggesting that heat resulting from operational centrifuges was coming from inside the buildings. The second hall probably started testing in January, 2015, and may have become operational by early February, their report said. ...

Source: <https://www.washingtonpost.com/>, 12 August 2015.

PAKISTAN

Pakistan Could Be World’s 3rd Biggest Nuclear Power in 10 Yrs

Pakistan could possess the world’s third largest arsenal of nuclear weapons in a decade, or have enough fissile material available for it, according to a new report. It is currently behind US, Russia, France, UK and China — the five nuclear powers

— and marginally ahead of India, according to this and multiple other recent estimates. The new report released projects Pakistan could possess 350 weapons in 10 years. Or, as said before, the ability to make them with available fissile material. And that would make Pakistan vault over France, China and UK — the number three, four and five powers — that have 300, 250 and 225 nuclear weapons respectively.

...Pakistan currently possess about 120 weapons (other estimates put in the 100-130 range), followed by India with around 100 (in the 80-100 range) and Israel with 80. But, the report, jointly by think tanks Carnegie and Stimson Center, says Pakistan is on course to more presuming India is sitting on a larger stockpile of fissile material. It has, therefore, fixed a target for itself to produce 20 nuclear warheads a year. Authors put its capacity at between 14 and 27 nuclear weapons a year, to

India’s two and five.

Here is how the math works, in the report: “India has about 600 kilograms of plutonium, while Pakistan has about 170 kilograms of plutonium and 3.1 metric tons of HEU. Assuming that each nuclear weapon would require five kilograms of plutonium or 15 kilograms of HEU, with existing stockpiles of fissile material India could theoretically construct up to 120 weapons, while Pakistan could construct up to 240....

Source: <http://www.hindustantimes.com/>, 28 August 2015.

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NUCLEAR NON-PROLIFERATION

IRAN

Iran Submits Nuclear Activity Information to UN Watchdog

Iran has submitted documents linked to its past nuclear activity, the UN’s atomic watchdog has

confirmed, a key condition of a probe into suspected efforts to create nuclear arms. The IAEA said Iran had met a key deadline by handing over the papers.... "Iran...provided the IAEA with its explanation in writing and related documents as agreed in the roadmap for the clarification of past and present outstanding issues regarding Iran's nuclear programme," the agency said in a brief statement published....

A senior Iranian official also confirmed that the documents had been submitted. The IAEA is to issue a report on its investigation by December 15. The agency has long sought to probe allegations that at least until 2003 Iran's nuclear programme had "possible military dimensions" – that it conducted research into making a nuclear bomb. ... following the deal reached in July with the so-called P5+1 Iran granted the IAEA tightly-controlled "managed access" to its military bases.

Source: <http://news.yahoo.com/>, 16 August 2015.

Rouhani Opposes Parliament Vote on Nuclear Deal

President Hassan Rouhani has opposed a parliamentary vote on the landmark nuclear deal reached with world powers, saying terms of the agreement will turn into legal obligation if it is passed by the house. Rouhani said at a news conference that the deal was a political understanding reached with world powers, not a new pact that requires parliamentary approval.

A special committee of the parliament has already begun studying the deal before putting it to a vote. But the legality of such a move is in doubt because the government has not prepared a bill to parliament for vote on. Rouhani said the Supreme National Security Council, the country's highest security decision-making body, is already studying

the agreement.

Source: <http://timesofindia.indiatimes.com/>, 29 August 2015.

KAZAKHASTAN

Kazakhstan to Host IAEA Nuclear Fuel Bank to Assist Non-Proliferation

The IAEA and Kazakhstan signed an agreement to locate the first internationally-controlled bank of low-enriched uranium in the ex-Soviet nation to ensure fuel supplies for power stations and prevent nuclear proliferation. The storage facility, set to become fully operational in 2017, is intended to provide IAEA member states with confidence in a steady and predictable supply of fuel even if other routes are disrupted.

Advocates also see it as a way to dissuade countries from building enrichment facilities that might be misused to purify uranium to weapons-grade levels – an issue that bedeviled relations between Iran and the West for more than a decade. The agreement on establishing the bank

was signed by Yukiya Amano, director general of the UN nuclear watchdog, and Kazakh Foreign Minister Erlan Idrissov. The bank will be governed by Kazakhstan's laws but fully managed and operated by the IAEA.

... NTI played a key role in establishing the fuel bank.

One of NTI's supporters, US billionaire investor Warren Buffett, contributed \$50 million to "jumpstart" the project, Nunn said. ...The IAEA estimates the cost of the bank at \$150 million, which includes the procurement of LEU and its work for the first 10 years. Amano said that...the Islamic Republic might in the future offer part of its own LEU stocks for the bank. Inventory for the bank will be bought through open tenders, he said. The bank will contain up to 90 metric tons

The IAEA said Iran had met a key deadline by handing over the papers. "Iran...provided the IAEA with its explanation in writing and related documents as agreed in the roadmap for the clarification of past and present outstanding issues regarding Iran's nuclear programme.

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of LEU, sufficient to run a 1,000 MWe light-water reactor, the IAEA said. Such a reactor can power a large city for three years, it said.

Symbolic Meaning: The bank will be located at the Ulba Metallurgical Plant in the northeastern industrial city of Ust-Kamenogorsk. The plant has handled and stored nuclear material, including LEU, safely and securely for more than 60 years, the IAEA said. The storage facility will be located not far from Semipalatinsk where the Soviet Union tested nuclear weapons, harming the health of locals and the environment. By the time of its 1989 closure following growing popular protests, Semipalatinsk had held 30 surface, 88 atmospheric and 340 underground tests....

Source: <http://www.reuters.com/>, 27 August 2015.

NUCLEAR DISARMAMENT

GENERAL

UN Conference in Japan Calls for Nuclear Disarmament

The United Nations Conference for Nuclear Disarmament concluded in the Japanese city of Hiroshima, urged the international community to create a world free of such weapons. Speaking at the closing ceremony, Hiroshima's Mayor Kazumi Matsui expressed his support for a proposal made by Algeria for a working group to examine legal restrictions on the possession of nuclear weapons. The considerations arising from that study will be presented at the next UN General Assembly in New York. Government officials and experts from 23 states discussed in this three-day conclave, recent trends for nuclear disarmament.

They also discussed, among other issues, about the inhuman consequences of using weapons of mass extermination, reported the television network NHK. This important event was held during this year's commemoration of the seventieth anniversary of the bombing of the Japanese cities of Hiroshima and Nagasaki. The atomic bombs dropped by the US government on those Japanese cities on August 6 and 9, 1945 caused 300,000 victims between dead or missing people, according to estimates of humanitarian organizations....

Source: <http://www.plenglish.com/>, 28 August 2015.

NUCLEAR SAFETY

INDONESIA

Indonesia's Nuclear Safety 'Can Be Improved'

A team of experts said the current framework "protects public health and safety" and there are a "number of good practices" but gave recommendations on how to strengthen it. The IAEA advised the government to "develop a national policy and strategy for safety, supported by a coordinated national action plan". It added the country should ensure national legislation for safety, including relevant regulations and guides, are kept up to date with current IAEA Safety Standards. It went on to suggest Indonesia should "ensure appropriate co-ordination between authorities with regulatory responsibilities".

Pil-Soo Hahn, Director of the IAEA's Division of Radiation, Transport and Waste Safety said: "The invitation to host the review demonstrates Indonesia's commitment to improving national radiation and nuclear safety and to learning from international experiences, particularly as it considers the option of nuclear power." The 14-member review team included senior experts from Australia, Egypt, Finland and the US.

Source: <http://www.energylivenews.com/>, 17 August 2015.

JAPAN

TEPCO Nuclear Safety Reformer Says Industry Needs Peer Reviews

Japan's nuclear utilities should consider peer safety reviews to raise standards and assuage public concern that the technology is unsafe following the 2011 Fukushima disaster, according to a safety adviser to Japan's biggest utility. An industry group is able to assess risks to nuclear plants better than a regulator, Dale Klein, former chief of the US NRC and now head of safety reform at Tokyo Electric Power Co., said in an interview. "In a lot of respects, they are tougher than the NRC," he said of peer reviews in the US Industry group members have experience running plants,

something most regulators don't, Klein said.

The US adopted the practice after the 1979 Three Mile Island nuclear accident when the utilities saw that problems in safety at one plant could spell the end for the whole industry, Klein said. Japan should implement the same practices as the government and industry seek to convince a reticent public that the nation should return to nuclear energy, Klein said. ... Tepco, which also operates the wrecked Fukushima plant, applied to switch Kashiwazaki back on. A restart of the Tepco facility faces a number of hurdles, including local government opposition.

The scrutiny means Tepco should take extra steps to reassure the public, Klein said. Kyushu Electric Power Co. restarted in August a unit at its Sendai plant, the country's first reactor in two years and the first under new regulations following the 2011 Fukushima Dai-ichi meltdown. The Sendai restart will help Tepco improve safety at Kashiwazaki, Klein said. "One would expect the first reactor restarts to be the most difficult," he said. "After Sendai, both the regulator and the public will know what kind of questions to ask, what are the issues to look for."

Source: <http://www.bloomberg.com/n>, 26 August 2015.

NUCLEAR WASTE MANAGEMENT

USA

Disposal Beats MOX in US Comparison

America is reconsidering how it will dispose of 34 tonnes of plutonium as the previous plan involving a MOX plant has been said to be twice as costly as a dilution and disposal option in a leaked DOE report. The plutonium arises from a

June 2000 nuclear weapons reduction agreement with Russia under which both countries would put 34 tonnes of plutonium beyond military use.

Russia opted to use its plutonium as fuel for fast reactors generating power at Beloyarsk.

The USA, meanwhile, decided to build a MOX nuclear fuel plant at Savannah River, where the plutonium would be mixed with uranium and made into fuel for light-water reactors. The design is similar

to Areva's Melox facility at Marcoule, but modified to handle metal plutonium 'pits' from US weapons and their conversion from metal to plutonium oxide. It is this part of the process that has been problematic. Construction started in 2007 with an estimated cost of \$4.9 billion but work ran into

serious trouble before being 'zeroed' in the DOE's 2014 budget, putting development on ice.

The Union of Concerned Scientists published what it said was an unreleased DOE report that compared the cost of completing the MOX plant to other options. Use in fast reactors was considered briefly, but with this technology not readily

available in the near term, the prime comparison was against a 'dilution and disposal' option which would see the plutonium mixed with inert materials and disposed of in the Waste Isolation Pilot Plant, or WIPP, in New Mexico.

Despite being 60% built, the MOX plant still needs some 15 years of construction work, said the leaked report, and then about three years of commissioning. Once in operation the plant would work through the plutonium over about 10 years with this 28-year program to cost \$700-800 million per year – a total of \$19.6-22.4 billion on top of what has already been spent. Not only is the price tag very high, but the timescale is too long: the

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report said this would not meet the disposal timeframe agreed with Russia.

The cost of the MOX plant could not be mitigated by income from sales of the MOX fuel because the regulatory process to gain approval to use MOX would be too burdensome for a commercial utility. The report said "it may be unlikely" that even a utility in a regulated market where fuel costs are passed on to consumers would "bear the risk of MOX fuel even if it is free".

Dilution and disposal would cost \$400 million per year, said the report, "over a similar duration" as MOX, working out at close to half the cost. Other advantages for dilution and disposal are that it requires no new facilities to be created or decommissioned after use, although the increase in WIPP disposal means.... This unique geologic disposal facility was said to be of "tremendous value to both DOE and the State of New Mexico".

Source: <http://www.world-nuclear-news.org/>, 21 August 2015.



Centre for Air Power Studies

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Centre for Air Power Studies

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